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GGSIPU physics 2010

1. A wire whose cross-section area is 4 mm^2 is stretched by 0.1 mm by a certain weight. How far will a wire of the same material and length stretch,If its cross-sectional area is 8 mm^2 and the same weight is attached?

(a) 0.5 mm (b) 1.0 mm

(c) 0.05 mm (d) 0.06 mm

2. A body has a charge of – 2 «C.If it has $2.5x10^{13}$ protons, then how many electrons the body ha ?

(a) $1.25x10^{13}$ (b) $2.5x10^{13}$

(c) $3.75x10^{13}$ (d) None of these

3. When light passes from one medium to other, then which of the following maychange ?

(a) Velocity and frequency

(b) Frequency and colour

(c) Velocity,wavelength and colour

(d) Velocity and wavelength

4. Mark the correct option.

(a) Ampere's law states that flux B through any closed surface is $«_0$ times the current passing through the area bounded by closed surface

(b) Gauss's law for magnetic field in magnetostatics serves the same purpose as Gauss's law for electric for electric field in electrostatics

(c) gauss's law for magnetic field states that the flux of B through any closed surface is always zero, wheather or not there are currents within the surface

(d) All the above

5. When a particle is moving in vertical circle,

(a) its redial and tangential acceleration both are constant

(b) its redial and tangential acceleration both are varying

(c) its redial acceleration is constant but tangential acceleration is varying

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(d) Its redial acceleration is varying but tangential acceleration is constant

6. 1 g of steam at 100^0 C mass of ice at 0^0C are mixed.The temperature of the mixture in steady state will be (latent heat of stem = 540 cal/g, latent heat of ice = 80 cal/g)

(a) 50^0 C (b) 100^0 C

(c) 67^0 C (d) 33^0 C

7. A tuning fork of frequency 580 Hz is employed to produce transverse waves on a long rope. The distance between the nearest crests is found to be 20 cm.The velocity of the wave is

(a) 58 ms^{-1} (b) 580 ms^{-1}

(c) 20 ms^{-1} (d) 116 ms^{-1}

8. Two instruments having stretched strings are being played in unison.When the tension of one of the instruments is increased by 1%,3 beats are produced in 2 s.The initial frequency of vibration of each wire is

(a) 300 Hz (b) 500 Hz

(c) 1000 Hz (d) 400 Hz

9. A circular coil of 200 turns and redius 10 cm is placed in an uniform magnetic field of o.1 T normal to the p,an of the coil.The coil carries a current of 5 A.The coil is made up of copper wire of cross-sectional area 10^{-5} m^2 and the number of free electrons per unit volume of copper is 10^{29}. The average force experienced by an electron in the coil due to magnetic field is

(a) $5x10^{-25}$ (b) Zero

(c) $8x10^{-24}$ (d) None of these

10. Long distance short-wave radio broad casting uses

(a) ground wave (b) ionospheric wave

(c) direct wave (d) sky wave

11. If the chage of 10 «C are given to two plates of a capacitor which are connected across a battery of 12 V, find the capacitance of the capacitor.

(a) 0.33 «F (b) 0.5 «F

(c) 0.41 «F (d) 0.66 «F

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12. When 1 g of water changes from liquid to vapour phase at constant pressure of 1 atm,the volume increases from 1 cc to 1671 cc .The heat of vaporization at the pressure is 540 cal/g.Find the increase in internal energy of water.

(a) 2268 J (b) 2099.33 J

(c) 2000 J (d) 2019.65 J

13. With the usual notations, the following equations $s_t = u+\frac{1}{2}a(2t-1)$ is

(a) only numerically correct

(b) only dimensionally correct

(c) Both numerically and dimensionally correct

(d) Neither numerically nor dimensionally correct

14. Abody is sliding down on a smooth inclined plane slides down the complete plane in

(a) 4 s (b) 5 s

(c) 2 s (d) 3 s

15. If a H_2 nucleus is completely converted into energy, the energy produced will be around

(a) 1 MeV (b) 939 MeV

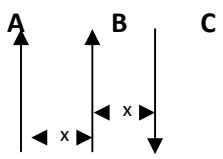
(c) 9.39 MeV (d) 238 meV

16. A taransistor is used in common-emitter configuration.Given its ~ = 0.9, calculate the change in collector current when the base current changes by 2«A.

(a) 1 «A (b) 0.9 «A

(c) 30 «A (d) 18 «A

17. A,B and C are parallel conductors of equal lengths carrying currents I,I and 2I respectively.Distance between A and B is x.Distance between B and C is also x.F_1 is thje force exerted by B on A. F_2 is the force exerted by C on A.Choose the correct answer.



(a) $F_1 = 2\ F_2$
(b) $F_2 = 2\ F_1$
(c) $F_1 = F_2$

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(d) $F_1 = -F_2$

18. What is the modulation index if an audio signal of amplitude one-half of the carrier amplitude is used in AM ?

(a) 1 (b) 0

(c) 0.5 (d) > 1

19. A steel wire 10 m long and 10^{-5} m^2 in cross-sectional area elongates by 0.01 m under a tension of 2500 N. Young's modules for steel from the data is computed as

(a) 2.5×10^7 Nm^{-2} (b) 2.5×10^9 Nm^{-2}

(c) 2.5×10^{11} Nm^{-2} (d) None of these

20. A wire of length L and radius r is fixed at one end. When a stretching force F is applied at free end,the elongation in the wire is l.When another wire of same material but of length 2L and redius 2r, also fixed at one end is stretched by a force 2F applied at free end, then elongation in the 2^{nd} wire will be

(a) l/2 (b) l (c) 2l (d) l/4

21. A block rest on a horizontal table which is executing SHM in the horizontal with an amplitude a if the coefficient of friction is «, then the block just start to slip when the frequency of oscillation is

(a) $\frac{1}{2\pi}\sqrt{\frac{\mu g}{a}}$ (b) $2\pi\sqrt{\frac{a}{\mu g}}$

(c) $\frac{1}{2\pi}\sqrt{\frac{a}{\mu g}}$ (d) $\sqrt{\frac{a}{\mu g}}$

22. Three objects coloured black,grey and white can withstand hostile conditions at 2800^0C.These objects are thrown into furnace where each of them attains a temperature of 2000^0C.Which object will glow brightest ?

(a) The white object

(b) The black object

(c) All glow with equal brightness

(d) Grey object

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23. A black body is at temperature of 2800 K.The energy of radiation emitted by this object with wavelength between 499 nm and 500 nm is U_1,between 999 nm and 1000 nm is U_2 and between 1499 nm and 1500 nm is U_3. The Wient's constant, b=2.88x10^6 nm-K. Then,

(a) $U_1=0$ (b) $U_3=0$

(c) $U_1>U_2$ (d) $U_2>U_1$

24. For light of wavelength 200 nm shines on an aluminium, 4.20 eV is required to eject an electron. What us te kinetic energy of the fastest ejected electrons ?

(a) $\frac{1240}{\lambda}$ (b) $\frac{1200}{\lambda}$

(c) $\frac{\lambda}{1240}$ (d) $\frac{1360}{\lambda}$

25. Light of wavelength 200 nm shines on an aluminium, 4.20 eV is required to eject an electron. What is the kinetic energy of the fastest ejected electrons ?

(a) 0.5 eV (b) 1.00 eV

(c) 2.00 eV (d) 4.00 eV

26. A body dropped from a height h with an initial speed zero reaches the ground with a velocity of 3 km/h.Another body of the same mass was dropped from the same height h with an initial speed 4km/h will reach the ground with a velocity of

(a) 3 km/h (b) 4 km/h

(c) 5 km/h (d) 12 km/h

27. When the plane surface of a planoconvex lens of refractive index 1.5 is silvered, it behaves like a concave mirror of focal length 30 cm. When its convex surface is silvered, it will behave like a concave mirror of focal length

(a) 10 cm (b) 20 cm

(c) 30 cm (d) 45 cm

28. In the visible region of the spectrum the rotation of the plane of polarization is given by

$\theta = a+\frac{b}{a^2}$

The optical rotation produced by a particular material is found to be 30^0 per mm at ^{a}=5000 $\mathring{A}$ and 50^0 per mm at ^{a}= 4000 $\mathring{A}$.The value of constant a will be

(a) $+\frac{50^0}{9}$ per mm (b) $-\frac{50^0}{9}$ per mm

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(c) $+\frac{9^0}{50}$ per mm (d) $-\frac{9^0}{50}$ per mm

29. 3.0 mW of 400 nm light is incident on a photoelectric cell, if 0.1% of the photons are contributing in ejection of electrons, then the current in the cell is

(a) 0.48 «A

(b) resistance value not given

(c) zero

(d) 0.96 «A

30. The scale of a spring balance reading from 0 to 10 kg is 0.25 m long.A body suspended from the balance oscillates vertically with a period of ®/10 s. The mass suspended is (neglect the mass of the spring)

(a) 10 kg (b) 0.98 kg

(c) 5 kg (d) 20 kg

31. At the height 80 m, an aeroplane is moving with 150 m/s.A bomb is dropped from it so as to hit a target. At what distance from the target should the bomb be dropped?

(Given g = 10 m/s^2)

(a) 605.3 m (b) 600 m

(c) 80 m (d) 230 m

32. A spring balance and a physical balance are kept in a lift. In these balances equal masses are placed. If now the lift starts moving upwards with constant acceleration, then

(a) the reading of spring balance will increase and the equilibrium position of the physical balance will disturb

(b) the reading of spring balance will remain unchanged and physical balance will remain in equilibrium

(c) the reading of spring balance will decrease and physical balance will remain in equilibrium

(d) the reading of spring balance will increase

33. Starting from rest a body sliudes down a 45^0 down the same distance in the absence of friction. The coefficient of friction between the body and inclined plane is

(a) 0.33 (b) 0.25

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(c) 0.75 (d) 0.80

34. A bomb of mass 1 kg explodes into 2 pieces of mass 3 kg and 6 kg. The velocity of mass 3 kg is 1.6 m/s, the KE of mass 6 kg is

(a) 3.84 J (b) 9.6 J

(c) 1.92 J (d) 2.92 J

35. There are two bodies of masses 100 kg and 10000 kg separated by a distance 1 m. At what distance from the smaller body , the intensity gravitational field will be zero?

(a) $\frac{1}{9}$ m (b) $\frac{1}{10}$ m

(c) $\frac{1}{11}$ m (d) $\frac{10}{11}$

36. If longitudinal strain for a wire is 0.03 and its poisson ratio is 0.5, then its lateral strain is

(a) 0.003 (b) 0.0075

(c) 0.015 (d) 0.4

37. Equal masses of water and a liquid of density 2 are mixed together, then the mixture has density of

(a) $\frac{2}{3}$ (b) $\frac{4}{3}$

(c) $\frac{3}{2}$ (d) 3

38. The volume of a gas at 21^0 C temperature and 76.8 mm pressure is 1 L.If the density of the gas is 1.2 g/L at NTP, then its mass will be

(a) 4 g (b) 4.21 g

(c) 1.13 g (d) 10 g

39. When heat is given to gas in an isothermal change, the result will be

(a) external work done

(b) rise in temperature

(c) increase in internal energy

(d) external work done and also rise in temperature

40. The temperature gradient of 0.5 m long rod is 80^0C/m.If the temperature of hotter end of the rod is 30^0C, then the temperature of the cooler end is

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(a) 40^0 C (b) -10^0 C

(c) 10^0 C (d) 0^0 C

41. For any SHM, amplitude is 6 cm. If instantaneous potential energy is half the total energy energy then distance of particle from its mean position is

(a) 3 cm (b) 4.2 cm

(c) 5.8 cm (d) 6 cm

42. Electric potential at any point is V= -5x+3y+$\sqrt{15}$z,then the magnitude of the electric field is

(a) $3\sqrt{2}$ (b) $4\sqrt{2}$

(c) $5\sqrt{2}$ (d) 7

43. The insulation property of air breaks down at $E=3\times10^6$ V/m.The maximum charge that can be given to a sphere a diameter 5 m is approximately(in coulomb)

(a) 2×10^{-2} (b) 2×10^{-3}

(c) 2×10^{-4} (d) 2×10^{-5}

44. Two wires A and B of same material and mass have their lengths in the ratio 1:2. On connecting them to the same source,the rate of heat dissipation in B is found to be 5 W. The rate of heat B dissipation in A, is

(a) 10 W (b) 5 W

(c) 20 W (d) None of these

45. Maximum kinetic energy of the positive ion in the cyclotron is

(a) $\frac{q^2Br_0}{2m}$ (b) $\frac{q^2B^2r_0}{2m}$

(c) $\frac{q^2B^2r_0^2}{2m}$ (d) $\frac{qBr_0}{2m^2}$

46. The magnet flux can be completely demagnized by

(a) breaking the magnet into small piece

(b) heating it slightly

(c) droping it into ice cold water

(d) a reverse field of appropriate strength

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47. The magnetic flux linked with a coil at any instant t is given by ¤ = $5t^3$-100t+300, the emf induced in coil in the coil at t = 2 s is

(a) 1.4 eV (b) 1.1 eV

(c) 5.4 eV (d) 6.8 eV

48. A photon of energy 3.4 eV is incident on a metal having work function 2 eV. The maximum KE of photo electrons is equal to

(a) 1.4 eV (b) 1.1 eV

(c) 5.4 eV (d) 6.8 eV

49. Order of magnitude of density of uranium nucleus is (m_p = $1.67x10^{-27}$ kg)

(a) 10^{20} kg/m^3 (b) 10^{17} kg/m^3

(c) 10^{14} kg/m^3 (d) 10^{11} kg/m^3

50. A ball is thrown from the ground with a velocity of $20\sqrt{3}$ ms^{-1} making an angle of 60^0 withb the horizontal.The ball will be at a height of 40 m from the ground after a time t equal to (g=10 ms^{-2})

(a) $\sqrt{2}$s (b) $\sqrt{3}$s

(c) 2 s (d) 3 s

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